

**Microgravity Science Division  
Microgravity Environment Program  
Glenn Research Center**

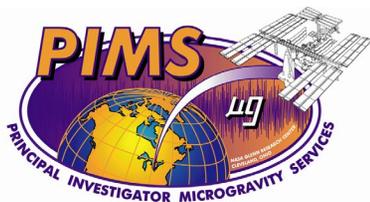


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# Microgravity Environment /Acceleration Measurement Program Overview

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## Microgravity Science Division Microgravity Environment Program Glenn Research Center



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# Microgravity Environment Program

What is the Microgravity Environment Program (MEP) charter?

We provide the following services:

- Acceleration Measurement Instruments for space and ground applications
- Detailed acceleration data analysis
- Platform Environment Characterization (identification of disturbers)
- Environment education
- Support for ISS microgravity requirements verification with dynamics emissions characterization testing and payload analysis techniques/processes.

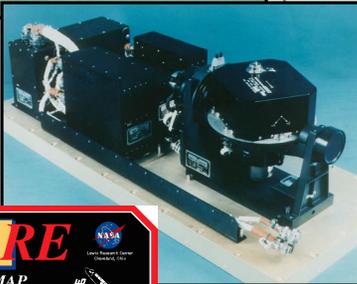
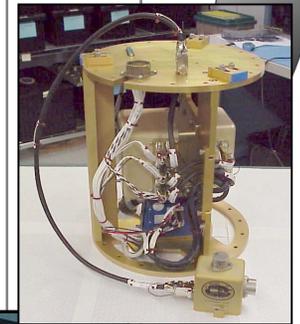
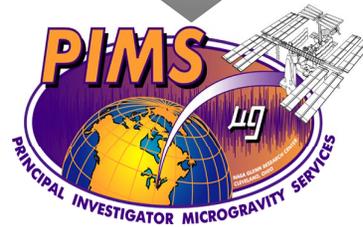
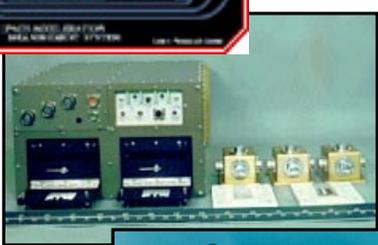
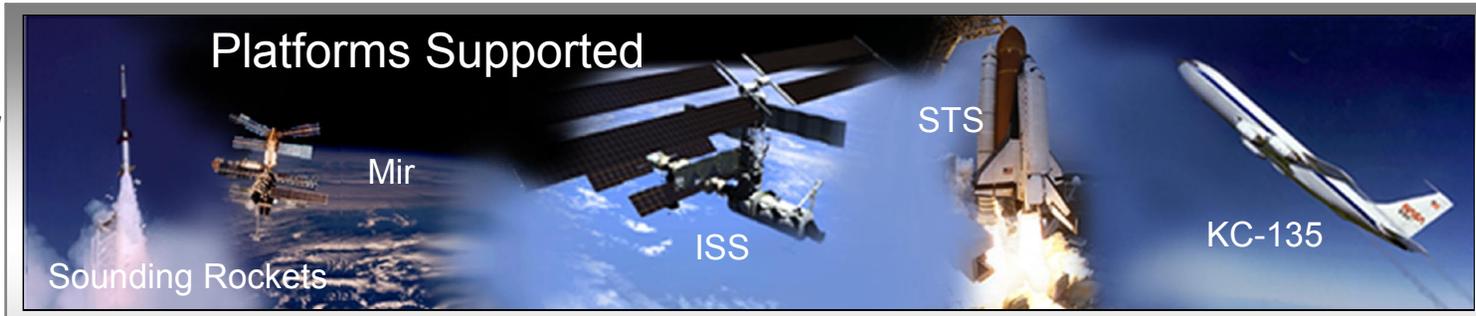
Our customers include:

- Principal Investigators
- Crew Members
- Payload Developers
- Vehicle Developers

We are sponsored by NASA's Code U microgravity program.



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Science Supported

Combustion

Fluid Physics

Fundamental Physics

Materials

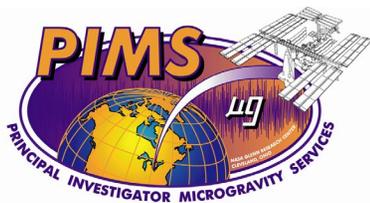
Vehicle Dynamics



Microgravity Emission Lab

Biotechnology





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## Microgravity Environment Program History

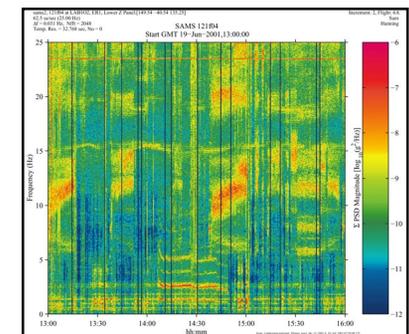
- **Space Acceleration Measurement System (SAMS) – 15 yrs**
- Missions supported on Sounding Rockets, STS, Mir
  - SAMS has characterized 20+ flights on STS & 3+ years on Mir
    - Flown on sounding rockets
  - OARE - Low frequency measurement system flown 11 times on STS
- International Space Station (ISS)
  - SAMS- II - The Vibratory Acceleration Measurement System for ISS
    - Launched on 6A
    - Operational since June 2001
  - MAMS - **Microgravity Acceleration Measurement System** –
    - Low frequency measurement system for ISS plus vibratory to 100 Hz
    - Launched on 6A
    - Operational since May 2001 – 5000+ hours of operation
- **PIMS- Principal Investigator Microgravity Services**
  - Processed over 1700 user requests and documented over 20 flights, 5 flight platforms, and multiple ground based platforms
  - Near real time ISS data on WEB, Increment 2 & 3 reports complete
  - 5<sup>th</sup> MEIT, 20 MGMGs



**SAMS on STS**



**SAMS II - ISS**



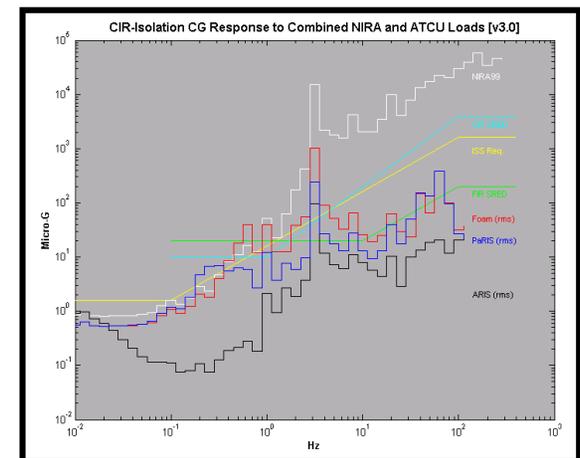
**PIMS Data Processing**

## Microgravity Environment Program

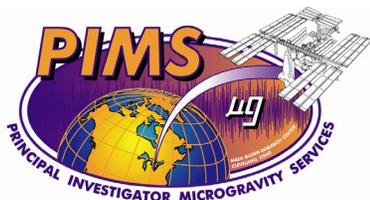
- Support for ISS microgravity requirements verification by testing and analysis.
- Testing
  - Dynamics Emissions Characterization by utilizing the Microgravity Emissions Laboratory (MEL). The MEL utilizes a 6 DOF inertial measurement system, capable of characterizing disturbances (down to 0.1  $\mu\text{g}$ 's) of the space-flight hardware.
- Analysis
  - Payload analysis techniques/processes for ISS microgravity verifications which includes:
    - PIRN 110H and ARIS Rack level allocations
    - Microgravity isolation approaches and integration processes
    - ARIS, Passive vs Hardmount comparisons
    - Verification/validation approaches and model requirements



Middeck locker suspended in the MEL



Comparison of Isolation techniques for FCF CIR



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## Microgravity Environment Program

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